



CRC/TRR 270

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## Hysteresis Design of Magnetic Materials for Efficient Energy Conversion

Tuesday, 14 April 2026, 9:00 s.t., @UDE and via Zoom



**Prof. Brian Cantor**

University of Oxford and Brunel University

### Multicomponent High-Entropy Cantor Alloys

#### Abstract:

All human advances have depended on making new materials, and all materials are alloys, i.e. mixtures of several different starting materials or components. So the history of the human race has been the continued invention of new materials by discovering new alloys. Recently a new way of doing this, by manufacturing multicomponent high-entropy alloys, has shown that the total number of possible materials is enormous, so we have lots of wonderful new materials yet to find. And multicomponent phase space contains a surprisingly large number of single-phase extended solid solutions and compounds. The first of these that was discovered are called Cantor alloys, an enormous composition range with a single-phase fcc structure, based on the original equiatomic five-component Cantor alloy CrMnFeCoNi. This talk discusses the history of alloying, the discovery of multicomponent alloys, the structure of multicomponent phase space, the thermodynamics of multicomponent solid solutions such as the Cantor alloys, the complexity of local atomic and nanoscale configurations in such materials, the effect on properties such as atomic diffusion, dislocation slip, recrystallisation and surface catalysis, and the resulting outstanding mechanical properties and potential applications, including at low and high temperatures, for corrosion and radiation resistance, and to enhance recycling and re-use.

#### About the speaker:

Brian Cantor is an Emeritus Professor in the Department of Materials at the University of Oxford, a Research Professor in the Brunel Centre for Advanced Solidification Technology at Brunel University London, and a Chief Editor of the Springer-Nature research journal High Entropy Alloys and Materials. He was previously Vice-Chancellor of the University of York and Bradford University, Head of Mathematical and Physical Sciences at the University of Oxford, and a research scientist and engineer at General Electric Research Labs in the USA; he also worked briefly at Banaras Hindu University, Washington State, Northeastern, IISc Bangalore and the Kobe Institute. He founded and built up the World Technology Universities Network, the UK National Science Learning Centre, the Hull-York Medical School, Oxford's Begbroke Science Park, the York Heslington East campus, the Wolfson Centre for Applied Health Studies, and the UN-backed International Centre of Excellence (ICE) in Circular Materials. He was a long-standing consultant for Alcan, NASA and Rolls-Royce; editor of Progress in Materials Science; Vice-President of the Royal Academy of Engineering; and Trustee of the UK National Science Museum Group, Marshall Scholarship Commission, and Leeds, York and Bradford Chambers of Commerce and Economic Development Boards. He invented the field of multicomponent high-entropy alloys and discovered the so-called Cantor alloys. He has won honours and prizes from many countries around the world, notably Commander of the British Empire (CBE), Fellow of the Royal Society (FRS) and Fellow of the Royal Academy of Engineering (FREng).